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# Applied Trophology, Vol. 15, No. 2 (Second Quarter 1972)

## Cholesterol

**Contents in this issue**:

- "Cholesterol: A Confused Subject."

The following is a transcription of the Second Quarter 1972 issue of Dr. Royal Lee's *Applied Trophology* newsletter, originally published by Standard Process Laboratories.

## Cholesterol: A Confused Subject

Cholesterol is a very important tissue constituent and, therefore, must not be considered as a substance to be avoided. Every liver in mammalian life, since the beginning of time, has normally produced cholesterol from ingested natural carbohydrates and fats and aided in their conversion to the normal fluids of the body.

Originally reported in the *Journal of Biological Chemistry* in 1938—and proven over and over again since then—was the fact that when test animals are fed cholesterol, they produce a corresponding lesser amount in their own livers. Until recent years this balance seems to have been maintained relatively normal, but for some reason extreme variations in blood cholesterol are noted today. Some researchers still often emphasize that the cholesterol theory, as regards atherosclerosis especially, is doubtful at best. Others believe that the newer hydrogenated fats and processed natural vegetable oils lack the natural fat metabolizers and that such conditions are aided and abetted by other processed foods.

Heart and vascular conditions rate as the number one killer in this country, and the death rate from such causes continues to rise. Nutritionists as well as many consumers are now wondering if changing from saturated fats in the diet to foods high in polyunsaturated fats will lessen these seemingly out-of-control conditions. Almost everyone has a friend or relative who has had a heart attack or stroke, so apparently something has happened to change the utilization of fats in the diet.

Previously, physicians were more concerned with cholecystolithiasis. They now concede that the cholesterol problem in heart and/or vascular conditions is of recent origin and in no way concerned with past biliary problems. Up to fifty years ago food produced for human consumption contained little, if any, chemical additives, and hydrogenated fat was used almost exclusively only in oleomargarine. According to statistics, the occurrence of heart and vascular diseases increased steadily over this period. Some scientists believe that this increase parallels the advent and increased use of chemicals in our food and later in our drinking water.

During this same period, serious diseases such as hepatitis, poliomyelitis, encephalitis, cancer, and other virus diseases have become quite common. In fact, some of these virus conditions are also rapidly increasing, possibly through the ingestion of these cell-destroying chemicals. In this instance cholesterol has lost its job in the construction of cell walls and could therefore become excessive in the bloodstream.

Normally, the amount of cholesterol in the body is constant, through intake or manufacture in the liver. It would appear then that a high cholesterol count for any length of time would denote a malassimilation or failure in utilization and warn the doctor to look for a more serious cause than the ingestion of eggs or butter. After all, natural fats and oils have been in the diet of animals and humans for thousands of years without problems, indicating that the body knows how to handle them. However, within the past fifty years we are expecting the body to adjust to the metabolizing of unnatural fats and oils, such as adulterated, overheated, hydrogenated, refined fats and/or chemicalized foods. Apparently, we have created a metabolic "Frankenstein."

### A Metabolic Problem

Metabolism is defined in part as "the sum of the chemical changes proceeding continually in living cells, by which energy is provided for the vital processes and activities and new material is assimilated to repair the waste."

To insure the keeping qualities of marketable foods, the food industry removes some of the perishable life-building elements that have always been easily metabolized and replaces them with nonnutritive chemical preservatives that cannot possibly be metabolized and may end up as cumulative toxins. Manufacturers and processors just keep on putting out one food after another, generally with little or no consideration of its nutritional value or systemic harmfulness. Only recently at an AMA-sponsored conference, food consultant Dr. Paul Fine stated, "Most of the food industry operates on a product-by-product basis with no interest in food itself. They have no commitment to the idea of food or even to their products as food." Such convenience foods contribute little, if any, nourishment and generally motivate indigestion and induce constipation.

The heart, as the hardest working muscle in the body, is the first organ to show the effects of being nutritionally cheated by these chemicalized, enzyme-inhibiting, empty calorie, nonnutritive…foods? Two-thirds of the total deaths in the U.S.A. are due to heart disease. Cancer has again continued in its second-place role for 1971. Other metabolic and/or deficiency conditions on the increase are arthritis, loss of teeth, liver disease, prostate gland trouble, and other glandular imbalances involving things from sex to obesity.

In 1921, [Sir Robert] McCarrison in his experiments determined that refined foods cause glandular inhibition and atrophy. The first endocrine gland to be damaged was the thymus, followed by the adrenals, sex glands, and the thyroid. He believed the cause to be the loss of the natural cholesterol mobilizers (probably hormone producers) found in natural unrefined fats and oils. Later, one of these fatty acid components was found to furnish the specific biologically active factor that prevents high blood cholesterol. A disturbed utilization of cholesterol, due to the loss of fat mobilizers, enzymes, and vitamins, either through processing or the addition of chemical preservatives no doubt, also contributes to other metabolic failures. Apparently, the vaunted P/S (polyunsaturated fat/saturated fat) ratio of two to one becomes valueless when the polyunsaturated fats have lost metabolizing aids such as the fat soluble and lipotropic vitamins and fat metabolizers, especially arachidonic acid, linolenic acid, linoleic acid, lecithin (the emulsifier), and the minerals calcium, magnesium, and iodine.

In careful tests on humans by Keys, the use of refined corn oil has been shown to increase the blood cholesterol instead of reducing it. No doubt, they have refined out some necessary mobilizers. With fresh, natural, unprocessed oils cholesterol metabolism is much less of a problem. For instance, eggs fried in hydrogenated vegetable oil caused a rapid rise in blood cholesterol, whereas those fried in fresh unrefined peanut oil caused no such rise in cholesterol. In an animal test on rats, refined fats failed to retain calcium or aid in its assimilation.

The general policy of food processors taking out vital natural factors and substituting purely chemical ingredients is not in accord with whole nutrition. We must have more unbiased research in this regard as deficiency conditions continue to cause more metabolic problems. Presently, the result of whole food research originates mostly in foreign countries. Consumers in this country who donate billions of dollars for research are receiving seemingly little benefits, if any, on their investments. Dr. Jean Mayer, Harvard's world authority on obesity and energy metabolism recently advised at the American Institute of Biological Sciences, in Miami, Florida, "We are spending 75 billion a year, to be where we were twenty years ago." During this time, however, he stated, "Life expectancy for the average adult male has not changed. For women it has increased slightly."

We need more information on the life-long effects of these new substances in our diet. Many of these so-called preservatives are being used in processed baby foods. Possibly, some of them may be the reason that children now suffer from diseases usually associated with old age. *Our Sunday Visitor* recently printed an article by Rosalie Stuart Franklin entitled, "Are We Nourishing Ourselves to Death?" in which she suggested that mothers watch food labels in order to "save our kids."

## Calories vs. Confusion

It is regrettable that in the past several years much misleading information has been found in the news media in regard to saturated fats in food causing a high blood cholesterol. Emphasis has been on fats being high in calories. Some physicians as well as consumers have been confused by this processed food advertising propaganda. *Webster* defines "calorie" as "the amount of heat required to raise one kilogram of water one degree centigrade." It is only a unit of heat (energy) having to do with body warmth and fuel as opposed to being nutritive. In comparison we find, "Food—nutritive material taken into an organism for growth, work or repair and for maintaining the vital processes." Nutritive foods must provide the proper balance of amino acids (protein), carbohydrates, fats, minerals and vitamins. Therefore, a low-calorie count diet, lacking assimilable fats for an extended period, could contribute to cellular damage.

Stressing the value of processed (hydrogenated) fats over fresh natural fats containing both saturated and unsaturated fatty acids has probably been a great big heartache for many people. For instance, it has been

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determined that arachidonic acid (a natural unsaturated body fat not found in so-called vegetable oils), is metabolized in the body from the unsaturated fatty acids, linolenic and linoleic, plus other natural complex metabolizing factors. Blackiston says, "It (arachidonic acid) is one of the fatty acids which will cure the syndrome in the rat caused by dietary deficiency of essential fatty acids." In some instances, it has been improperly confused with arachidic acid, a solid saturated fatty acid obtained from peanut oil.

## Cellular Nutrition

As defined previously, nutrition is the utilization of food. Over-processing of fats and oils by overheating, homogenizing, hydrogenating, charcoal filtering, or chemically treating inhibits assimilation and generally leaves them with little nutritive value, sometimes able to clog up the eliminative organs. Proper metabolism at the cell level is the secret of bodily health. If the metabolism of each individual cell is normal, the whole body will function normally. Interference with cholesterol in its function to form hormones and cell walls could be a major cause of disease. Good quality nutritious foods will provide the stability and health of all tissues.

In *Nutrition Against Disease*, Dr. Roger Williams expresses belief that cells not bathed in optimum quantities of all the nutrients are forced to do the best they can even though the supply may be far below the optimum. This optimum cell bath he calls "super nutrition" and advises that it is unrelated to calories. Other biochemists are beginning to realize that the living cell depends upon food for health and that if the food is poison the cell becomes sick and produces virus and other diseases. Scientists now define a virus as a living poison produced in living cells. Cellular nutrition can only be supplied by forcing the diffuse nutritional fluids through the capillary beds. As cholesterol contributes to cell wall structure, it has presumably been linked with high blood pressure. However, reducing the cholesterol count seldom lowers blood pressure as the cells must, as Dr. Williams said, "be constantly bathed."

## Atherosclerosis, Enzymes, and Lipids

Some nutritionists believe that atherosclerosis, obesity, and gallstones may be caused by an insufficient supply of the nutrients necessary for complete fat and/or carbohydrate metabolism. If so, we must presume that cholesterol (bile, solid-alcohol) is just the whipping-boy for malassimilation of over-chemicalized or processed foods. The amount of large particles of fatty substance clinging to the arterial walls in atherosclerosis is presumed to be due to the loss of fat mobilizers in some of the newer types of hydrogenated and other unnatural fats.

Recently we have learned that the lipid phenomena of artery linings and other tissues are concerned with and controlled by enzyme mechanism. If exposed to foreign extraneous minerals such as aluminum, cadmium, fluoride, lead, mercury, nickel, and possibly others in abnormal amounts, vital pyridoxine-enzyme action is blocked and lipid metabolism goes awry. Pyridoxine is said to furnish the breakdown mechanisms in the enzyme systems that deal with oils, cholesterol, lipoproteins, and other lipids. The deficiency of pyridoxine and associated enzymes may be factors in arteriosclerosis, according to Rhinehart and Greenberg, as a result of experiments with monkeys.

The metabolism of cholesterol seems much restrained by enzyme inhibiting chemicals. Another example is inhibition of the function of cholesterolase by the fluorides. Cholesterolase is an enzyme found in the liver and in blood serum that catalyzes the esterification of cholesterol. We no longer can consider sodium fluoride as incidental to our drinking water. As fluoridated water, it has become an integral part of many foods and drinks. Therefore, it is exceeding the 1/ppm limit many times. The importance of cholesterol metabolism is further emphasized when we consider that seven biologically active steroids have been isolated from the adrenal cortex. Cholesterol serves as the precursor of these sterols, which are converted to hormones by the adrenal glands and the gonads. If cholesterol cannot be mobilized and converted to hormones, could the lack of sex hormones be a contributor to the recent rampant orgy of homosexuality?

With phosphorus, fat (lipids) forms the phospholipids so necessary in protecting and rebuilding of nerve cells. In fact, the myelin sheath of nerves is composed of phospholipids and cholesterol. It is the short circuiting of these nerve impulses by the extrinsic minerals aluminum and lead found in some deodorants that make antiperspirants function as drying agents. The phospholipids yield phosphorus as phosphoric acid, nitrogen as the amino acid radical, and fatty acids.

Cholesterol and lecithin produced in the liver make up the important body phospholipids. Lecithin is a lipid that is composed of phosphorus, fatty acids, and glycerin combined with choline. With arachidonic acid lecithin emulsifies the fat in the bloodstream so it can be utilized by the body cells. In animals the presence of both in the blood increased their resistance to atherosclerosis. The phospholipids of brain and spinal cord tissues are called cephalin and are composed of both saturated and unsaturated fat combined with cholamine. Both lecithin and its component choline and cephalin with cholamine are very active in lowering blood cholesterol.

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A derivative of choline, acetylcholine plays an important role in the transfer of nervous impulses. Some investigators believe that the extraneous minerals in these antiperspirants interfere with acetylcholine production. Cholesterol in combination with bile acids provides the major course of excretion of fats, hence plays a less critical role in atherosclerosis than do the total blood lipids.

## Cholesterol Needed

Cholesterol, then, is a normal constituent of natural animal and human fats and has a sterol counterpart in plant life known as sitosterol. Apparently, the sterols are needed as a metabolic entity in both animal and plant life. In the body we find cholesterol is an important constituent of bile, blood, lymph, hormones, fat-soluble vitamins, cell membranes, and of brain and nervous tissue. In the skin, cholesterol is apparently activated by sunlight to form vitamin D. Some investigators now claim this action is a hormone producing factor.

Too much sunlight, too rapidly, has caused acute intoxication with vitamin D, also known as sunstroke or heatstroke. It is believed to be due to unbalancing the tissue calcium ratio, with respect to the blood calcium, with tissue calcium too low. Ingestion of natural fatty acids have in some instances aided in the ionization of calcium to restore this balance. Refined fats and oils seem to have lost the ability to thus retain and utilize calcium. Some nutritional clinicians believe it is this factor, as well as the loss of natural cholesterol mobilizers, that may be a contributing cause in the loss of the second sound in the mitral area of the heart. It is also possible that some of these unnatural fats do not stay in solution at body temperatures because they cannot furnish the key metabolizers.

Investigations by Dr. Paul Owren of the University of Oslo does not agree with American investigators who state that the polyunsaturated fats of corn oil, cottonseed oil, safflower oil, and soya oil can prevent heart attacks when substituted for animal fats in the diet. Although linoleic acid in natural vegetable oil does reduce cholesterol, we know that arachidonic acid in beef fat does it better. Dr. Owren advises that "an increased tendency to thrombosis and coronary heart disease may be directly related to a relative deficiency of linolenic acid." His observation on animals and several hundred patients proves that small amounts of linolenic acid prevent blood platelets from clumping together on vascular walls. His report further stated that "it is due to this clumping and sticking that a thrombus may form to plug a vein or artery."

Linolenic acid is found in fresh flaxseed oil (45 to 60 percent), soy oil (7 percent), and butter (1 percent). Other food sources are beef and pork fat, fresh whole grain wheat and rye cereals, and their breads. "The amount in any of these products is cut in half by modern refining methods," Dr. Owren stated. Thus, it would seem that restricting the intake of natural foods like butter, eggs, and meat fat could, in many instances, do more harm than good by increasing malnutrition. Conclusive proof that a high level of cholesterol alone leads to coronary thrombosis has never been proven, so apparently the cause is more complicated.

## Carbohydrates

According to Dr. Margaret J. Albrink, a West Virginia physician-nutritionist, refined carbohydrates are very suspicious in causing atherosclerosis. She contends that the present large intake of carbohydrates, especially refined sugar, is more responsible than any change in fat consumption. In her report to the Federation of American Societies for Experimental Biology, she stated in part:

> "Serum triglyceride levels may be a better indicator of coronary risk than total serum cholesterol levels. Whenever caloric intake is excessive, whether from carbohydrate or fat, the surplus calories are stored as lipids. The increased fat levels and fat transport show up as an increase in blood triglycerides. Further, serum triglyceride concentration profoundly affects the physical form of cholesterol, whether circulating as normal lipoproteins or as giant low-density atherogenic particles."

In the Middlesex Hospital, England, Dr. Kekwick found that using the same number of calories, his subjects gained weight on a high carbohydrate diet and lost weight on a high fat diet. Loss of weight has, in a few instances, resulted in lowering the blood cholesterol level. In most cases the blood thickening seems to be an individual metabolic problem and more often due to a high carbohydrate diet rather than a high fat or low protein diet. For instance, a recent comparison shows that New Zealanders, who eat very little fat, have more coronaries than the Norwegian natives who have a diet heavy in fat. The latter are apparently following Dr. Owren's advice in regard to linolenic acid in their diet.

Through his experiments at the University of London, Dr. John Yudkin is convinced that sugar is the culprit in the increased incidence of heart attacks.

Dr. Denis Burkitt believes that white flour and white sugar are responsible for many heart and circulatory problems, as well as diabetes. With one-third of the grain stripped off in refining white flour, practically all starch remains. Since starch is digested and assimilated as sugar, we have also increased our carbohydrate environmental

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Dr. Michael J. Walsh, Director of Clinical Nutrition, University of California Dental Extension in San Francisco says, "We Americans are suffering acutely from dietary deficiencies." He especially condemns "soil deficiencies, foods that have been processed or refined and our alarming consumption of sweets." He further states that "60 percent of our food today is refined sugars, …corrected nutritional habits would immediately stop 87 percent of all tooth decay."

Dr. Robert Wissler of the University of Chicago also determined in feeding primates (rhesus monkeys), believed to have metabolic action similar to humans, that the amount of refined sugar in American diets must be reduced.

Some years ago, when Dr. Royal Lee made statements in regard to refined and processed foods affecting our nutritional balance, he was vilified as a charlatan because his statements did not conform to the "consensus of medical opinion." Now, a group of investigators and medical students view this axiom as "technical idiotism, as it prevents progress and is frequently without a view beyond it." This challenge further inspired Dr. Lee to proceed in nutritional investigation. As a result, he became an internationally known nutritional authority previous to his death in 1967. We now find his statements that refined carbohydrates are partly responsible for heart and circulatory conditions verified by such renowned medical and nutritional authorities as Dr. A.M. Cohen (Israel), Dr. Fredrik Wahlberg (Sweden), Dr. Peter Kuo (University of Pennsylvania), and Dr. Frederick Epstein (Michigan).

Although the nutritional use of fats and oils has increased in recent years, sugar consumption has increased far more—namely, from fifteen pounds per head in 1815 to over 100 pounds per head, per year, presently. For better national health, nutritional authorities generally agree that we must cut down on carbohydrates (especially refined carbohydrates) and increase our consumption of proteins. Diets high in sugar and starch tend to promote the formation of residual body fat and obesity.

## More on Chemical Additives in Food and Drink

Nonnutritive chemicals can become a metabolic deterrent and do not become just so much waste matter as consumers are led to believe. At the present time, according to Senator Gaylord Nelson of Wisconsin, over 3,000 chemical additives find their way into our food. He has introduced a bill to curb food additives, as, he says, "The average American eats five pounds of additives every year."

Last year we learned through Norwegian research that the **nitrates** and **nitrites** used in meat products such as sausages, corned beef, dried beef, bacon, and ham unite with amino acids to form nitrosamine, a known carcinogenic agent.

***Ethylenediaminetetraacetic acid*** **(EDTA)** prevents off taste and rancidity by forming chemically inactive complexes with the minerals in the foods to which it is added. In nutrition, we need these minerals to unite with proteins and vitamins to form enzymes. Shortage of enzymes disturbs various metabolic processes. This enzyme inhibitor is used in salad dressings, beer, sodas, sandwich spreads, crabmeat, shrimp, pecan pie filling, and margarine.

***Diethyl pyrocarbonate*** **(DEPC)** is added to beer, soft drinks, noncarbonated wines, and some fruit-based beverages to prevent fermentation. It is now under observation by the FDA because Swedish scientists found that it combines with ammonia in beverages to produce urethan, a cancer-causing chemical, discovered in 1943.

***Butylated hydroxyanisole*** **(BHA)** and ***butylated hydroxytoluene*** **(BHT)** are anti-rancidity agents presently withheld from baby foods in England and under a 50 percent observation rate in adult foods. In this country both agents are used in most dry cereals, in some commercial fats and oils, and in cat and dog food.

**Monosodium glutamate (MSG)** has now been banned in baby foods in this country because it was found to produce brain and eye damage in infant rats. It is still being used in a variety of adult commercial foods.

**Diethylstilbestrol (DES)** is used in animal food in Canada and United States, as a short method of fattening cattle and sheep for the market. This synthetic estrogenic hormone has now been banned in animal food in twenty-one countries. Withdrawal dates for feeding prior to slaughtering have been in effect in Canada in recent years and also became effective in this country in January of this year. As regulatory efforts to date have failed, Commissioner Edwards proposed a ban on the liquid form of DES fed to cattle and sheep, with a complete ban possible of the seven-day inhibitory feeding period continued to be disobeyed. Italy and Sweden, incidentally, have banned U.S. imports of beef because of our use of DES. Wisconsin Senator William Proxmire has introduced a bill to ban the use of DES in animal foods. Eventually other chemicals will be banned. According to the FDA, "About 80 percent of meat, milk and eggs consumed in the U.S. comes from animals fed on medicated feeds during part or all of their life." The use of antibiotic feed additives, designed to keep animals healthy, have been found to produce human disease organisms resistant to antibiotics. Worthy of note is the fact that antibiotics, generally, cause the

loss of friendly intestinal bacteria that aid in assimilating nine vitamins, including the B complex and vitamin K.

Some veterinarians advise that as chemical and/or drug feeding continues, domestic animals acquire heart disease and other human-like maladies. Presently no one seems to know what this medication of animals (used for food) and the numerous combinations of chemicals added to our food will do to, or in, the body. It is quite apparent that deficiency and metabolic diseases are on the increase.

A possible new fat metabolic problem may be in the making. In recent years the detergent binge has affected the soap manufacturers. Now most of the stale and possibly rancid fats that were used in soap making go into animal foods. The food processing industry has managed to cover up the acrid rancid taste with BHA, BHT, and other chemicals, but it is very doubtful if they have eliminated the known carcinogens found in overheated or rancid fats and oils.

In January, a new chemical interference with metabolism occurred in Maine. The FDA found chickens sick and dying from eating grain feeds contaminated by PCB, a DDT-like chlorinated hydrocarbon. Tests of the chicken fat showed from the up to 5 parts per million (FDA allowance for human consumption) to 172 ppm. Hydrocarbon chemicals, such as PCB, have been linked to stillborn and deformed children, skin irritations, and liver damage. Apparently, a damaged or toxic liver could affect fat metabolism and increased blood cholesterol.

Because of the commercial propaganda, in an attempt to whitewash hydrogenated fats carried on by the food processing industry and backed by some syndicated columnists, cholesterol has taken the rap for the many other contributors to metabolic conditions in which cholesterol appears to have only been an effect rather than a cause.

Medical authorities must now change their attitude in view of the above and other evidence coming to light from day to day. The sensible attitude must be to eliminate all nonnutritive additives that interfere with normal body chemistry, all synthetic, refined, processed, and contaminated fats, and eat only natural fats, commensurate with good dietary practices, in proportion to unrefined carbohydrates and proteins necessary to supply adequate balanced nutrition, in any specific occupation or situation in life.

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Selene River Press is a publishing company specializing in holistic nutrition education. Our philosophy is rooted in the work of Dr. Royal Lee, who showed that vitamin deficiencies, due to processed foods, are responsible for most degenerative disease. From organic farming to food-based vitamins, from raw milk to fermented foods, Dr. Lee set the course for the field of whole food nutrition.

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